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Do General Practitioners Know Patients' Preferences? An Empirical Study on the Agency Relationship at an Aggregate Level Using a Discrete Choice Experiment

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A B S T R A C T

Objectives: This study investigated whether general practitioners (GPs) know patients' preferences regarding a number of organizational characteristics in general practice (i.e., waiting time on the telephone, opening hours, waiting time to the appointment, distance to the general practice, waiting time in the waiting room, consultation time, and whether the GP or assisting personnel performs routine tasks) to examine whether there is a basis for improving the agency relationship at an aggregate level. **Data:** A total of 698 respondents from the Danish population and 969 GPs answered the questionnaire in May and September 2010. **Methods:** In a discrete choice experiment, GPs and patients made both forced and unforced choices, allowing us to explore the congruence of preferences 1) when patients must choose a new GP and 2) when they can stay with their current GP. **Results:** Results show that in the forced choice, preferences are seen to differ. In the unforced choice also, preferences differ—mainly because GPs overestimate their own importance to the patients. Rank orders, however, are similar for both GPs and patients. **Conclusions:** It is concluded that GPs do not have a precise knowledge of patients' preferences. However, in the unforced choice, GPs do know on which attributes to compete although they underestimate the necessity of competition. The overall conclusion is that there is room for improving the agency relationship in the organization of general practice.

Keywords: discrete choice experiment, general practice, organization, principal-agent relationship.

Introduction

Numerous researchers have investigated the field of agency theory in primary care, and the originating literature within the field of health economics often uses a conceptual approach to describe the principal-agent relationship, where the general practitioner (GP) acts as an agent for the patient, that is, the principal [1–3]. Asymmetric information, as when a patient is less well-informed about appropriate treatments than the attending GP, typically exists in the agency relationship, in which the patient delegates decision-making authority to the GP assuming that the GP makes the best decisions. The perfect agent is one who chooses as the patients themselves would choose if only the patients possessed the same information that the GP does [4,5]. Because other attributes than health are included in the principal's utility function, the issue of agency is not limited to apply to health only [1,6,7], and researchers are generally encouraged to elicit patients' preferences for factors other than health outcomes because of the difficulty of designing a utility generating system without knowing what objectives it should be trying to meet [8].

Nonalignment of agents' and principals' preferences may arise if the GPs do not know the patients' preferences [1,5], in which case the issue of asymmetric information is reversed and the barrier to better agency may be the GPs' lack of full information on patients' preferences for health-care service attributes. The issue of possible nonalignment due to the GPs being less than perfectly informed on patient preferences is the focus of this empirical article, in which a discrete choice experiment (DCE) is applied. The aim is to elicit and compare patients' preferences and the GPs' perceptions of patient preferences for different organizational aspects in primary care to investigate whether there is a basis for improving the agency relationship in general practice. The analysis will compare aggregate GP preferences with aggregate patient preferences, because matching of GPs and patients was not possible.

To the authors' best knowledge, this is the first study that empirically examines the agency relationship in a general practice setting by using a DCE. The agency relationship has been investigated empirically in a number of satisfaction studies, where 1) GPs' own preferences were compared with patients' preferences, for example, [9–11], and 2) GPs' perceived preferences of patients were compared with the patients' preferences, for example, [12]. Three DCE studies have also compared patients' preferences with doctors' perceived preferences of the patients [13–15]. None of these were conducted in a general practice setting. The DCE has the advantage over common satisfaction studies in that it enables the researcher to systematically investigate the relative importance of the included topics of investigation by forcing respon-

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dents to make trade-offs hereby providing information about the importance of different aspects relative to each other. This study adds to the knowledge of existing studies examining the agency relationship in performing a comprehensive investigation of whether and how preferences differ by using a number of different approaches (tests for parameter equality, calculations of all possible combinations of marginal rates of substitution [MRS], reports of rank orders, tests for differences in choice behavior across choice sets, and tests for differences in scale), many of which have not been applied previously within this area of investigation.

In the present study, aggregate preferences were compared in a dual-response approach in which respondents were first asked to make forced choices and hereafter allowed to opt out by choosing the status quo. We investigated 1) whether GPs know which attributes are more important to the patients when they are forced to choose a new GP and 2) whether the GPs know the preferences and loyalty of the patients when they have the option of staying with their current GP. Finally, we seek to discuss how potential nonalignment of preferences can be explained and how citizens' preferences can be taken into consideration in the organization of the primary health-care sector.

Methods

Setting

As in many other countries, GPs in Denmark run private practices and are reimbursed by the health-care authorities (Danish Regions) in a mix of capitation and fee for service. The number of GPs practicing in each region is agreed upon between the Danish Regions and the Organisation of General Practitioners in Denmark through annual negotiations. In Denmark there are about 3600 GPs distributed relatively evenly across the country. In this way, the Danish health system has succeeded in achieving relatively short travel distances to GPs and reasonable equity in access to GP services. However, the recruitment of doctors into general practices has started to become more problematic and some regions are facing difficulties when having to replace retiring GPs, especially in rural areas of the country. The Danish population is free to register with a GP of their own choice, subject to a maximum distance of 15 km (5 km in Copenhagen and Frederiksberg municipalities) between their home and the practice. When the GP has 1600 patients on list, patient intake can cease, but the GP is free to accept up to 2700 patients on list. Hereafter access will be closed automatically to sustain a certain level of quality in patient treatment. Because of the regulation of location and number of GPs in general practice, and also partly because of GP shortages, GPs are ensured solid market positions, which preclude perfect competition in the market. When perfect competition is absent, GPs may not have distinct incentives to gather information on patients' preferences and organize accordingly to attract them to their practice. Therefore, the imperfect competition in general practice further motivates the investigation of whether GPs are aware of the preferences of the patients.

Survey design

Patients' preferences and GPs' perceptions of patient preferences for different organizational characteristics, that is, waiting time on the telephone, opening hours, waiting time to the appointment, distance to the general practice, waiting time in the waiting room, consultation time, and whether the GP or assisting personnel performs routine tasks, were examined at an aggregate level in a DCE. To ensure operable and policy-relevant results, the choice of attributes was guided mainly by three criteria. First, an essential decision criterion for an attribute to be included was that it should be expected to influence the patients' choice of GP. Second, the GPs should be able to influence attribute levels. Third, the attributes should be objective and not relate to intrinsic GP characteristics related to personality. The criteria entailed that personal GP characteristics such as age and gender were excluded, as were practice type and intangibles such as the GP's ability to listen to the patient and willingness to adhere to patients' preferences. Distance was deemed an attribute that the GP could influence by settling in a more local practice setting rather than a larger shared practice. The attributes and levels were chosen on the basis of examination of results from other studies investigating patients' preferences for the organization of general practice (e.g., [11,16–22]), visits at different general practices, interviews with GPs, interviews with patients, and discussions with the Organisation of General Practitioners in Denmark. Table 1 provides an overview of attributes, attribute levels, and the expected effects of the attributes on preferences for choice of GP.

In the experimental design phase, a Bayesian efficient main-effects design was created [23,24] by means of the software Ngene provided by ChoiceMetrics (www.choice-metrics.com). Bayesian efficient designs are found to be robust to misspecifications when the sample is sufficiently large ($n > 250$), and efficiency gains are possible. The gains are more significant when the attributes with a priori expectations have a relatively large weight in the utility function, the prior information is of good quality, and the data-generating process is consistent with the specification chosen in the design, for example, a multinomial or mixed logit model [23]. Two hundred Halton draws were used to approximate the probability density function, and a column-based swapping algorithm was used to find the most efficient design of those available. The attributes waiting time on the telephone, opening hours, waiting time to the appointment, distance to the general practice, and waiting time in the waiting room were assumed to be uniformly distributed according to the hypotheses in Table 1. Consultation time and routine tasks were assumed to follow a normal distribution with a positive and a negative mean, respectively. Sixteen choice sets were created ensuring, sufficient degrees of freedom, and the design was blocked into four by minimizing the average correlation between the blocking column and the attribute columns [25]. Patients and GPs were randomly allocated to the four blocks, and it was tested whether randomization was successful on the variables age, gender, and geography by using Pearson's chi-squared tests (because the blocking variable was nominal) [26].

The patient questionnaire was initiated with a number of introductory questions about the respondents' use of and satisfaction with their GP and questions about their GP's typical waiting times, consultation length, opening hours, and so on. GPs were asked questions about the organizational characteristics of their practice. Hereafter, the DCE was introduced and for each of the four choice sets, respondents were first asked to make a forced choice followed by an unforced choice. This dual-response technique is argued to be a valuable approach, especially if there is a possibility of a large number of status quo choices [27], which was expected in this survey because of transaction costs associated with choosing a new GP and fear of the unknown. It is acknowledged, however, that the unforced choice should always be chosen if there is an option of opting out or choosing the status quo and if the intention is to derive welfare measures [28–30]. In the present context, both the forced and unforced choices represent realistic scenarios. Individuals may be forced to choose a new GP if their current GP relocates or retires or if they themselves move to a new area (this is especially pertinent in countries with scarcity of GPs, e.g., in Denmark, where approximately one third of all GPs are older than 60 years and close to retirement). At the same time, individuals always have the option of choosing a new GP should they wish to do so. The dual-response approach allows us to investigate 1) whether GPs know the preferences of the patients when status quo is not an option and 2) whether GPs know the preferences and loyalty of the patients when patients have the

Table 1 – Attributes, attribute levels, and hypotheses for both GPs and patients.

Attributes	Description	Attribute levels (effects coding)	Hypotheses
Telephone	Typical waiting time on the telephone	1 min 5 min 15 min 30 min	−
Opening hours	Opening hours (besides normal opening hours)	No extended opening hours (−1) Open on Saturdays (1)	+
Appointment	Typical waiting time to the appointment (with a nonacute problem)	Same day 3 d 1 wk 2 wk	−
Distance	Distance to the general practice	1 km 5 km 15 km 30 km	−
Waiting room	Typical waiting time in the waiting room	5 min 10 min 20 min 30 min	−
Consultation time	Average time allocated to the consultation	5 min 10 min 20 min 30 min	+
Routine tasks	Who performs routine tasks (e.g., blood samples, tests for allergies, vaccination)	GP (−1) Nurse (1)	−

GP, general practitioner.

opportunity to stay with their current GP. The unforced choice reflects a situation in which GPs are to reflect on patients' choices among patients who are already on their list. In the forced choice, the GPs are to predict patients' choices in a situation in which all GPs are unknown to them. Both scenarios represent the type of competition that GPs in principle face continuously: maintaining existing patients on their list as well as attracting new patients. Figure 1 shows an example of a choice set as it was presented to the patients and the GPs. Subsequent to the DCE, questions on the participants' personal characteristics were posed.

The patient questionnaire was tested in a cognitive interview [31], which led to minor changes. Afterward, a Web-based pilot study with 28 respondents (drawn as a convenience sample from the Danish population) was conducted. While answering the questionnaire, the respondents were three times encouraged to comment on the questionnaire and state if they felt something was missing. Afterward, conditional logit (CL) analyses were conducted to estimate preferences on the sample. These interviews confirmed that all relevant attributes were included, because none of the interviewees felt that important GP characteristics were omitted. The pilot study led to minor changes. The most important was a reduction in the number of choice sets from eight to four. Many respondents stated that eight choice sets were too many because they got confused, lost perspective, and could not distinguish the choice sets from each other. The GP questionnaire was tested in three cognitive interviews [31] with GPs from different general practices. The cognitive interviews led to several adjustments related to the wording and options given in the questionnaire to make the questions realistic to the GPs and in correspondence with the collective agreement. Afterward, a pilot study with seven GPs was conducted, which led to minor changes.

Method of data collection

Paper-based questionnaires were forwarded to the GPs while a Web-based survey was used for eliciting patients' preferences. The interviewed GPs and the Organisation of General Practitioners in Denmark expressed preferences for having questionnaires sent out by regular mail because this was more convenient to the GPs and accorded with their usual working procedures. The Web-based survey was chosen for the patients because 89% of the Danish population has Internet access in their own homes [32], and many elderly people are computer literate (43% of the Danish population in the age group 65–89 years uses a computer every week [33], indicating a fairly high literacy). Coverage error is therefore not a major problem in Denmark, although the prevalence of a panel effect cannot be excluded [34]. Problems with the use of different sampling procedures when preferences are compared are addressed in Nielsen [35]. Studies comparing results from stated preference surveys using paper-based and Web-based surveys have not found differences in stated preference results [36,37].

A total of 698 respondents from the Danish population answered the patient questionnaire, which was sent out in May 2010 as part of a larger Web-based survey. Respondents were recruited from an Internet panel where members (>18 years of age) received an e-mail with a link to the questionnaire. The target sample size was 1400 respondents (for all versions of the survey), and the link was deactivated when the quota was met (the target sample size was expected to be sufficient on the basis of the median S-optimality estimate of 1077, which provides a lower bound estimate for the necessary sample size to obtain significant parameter estimates [38]). In total, 1435 respondents answered the questionnaire. Those respondents not included for the purpose of this study (n = 737) received a similar DCE in which a cost attribute was also included. Respondents were randomly allocated to either the DCE with inclusion of a cost attribute or the DCE without the inclusion of a cost attribute. Results comparing the estimates from the two DCEs with and without the cost attribute are presented in another article [39]. The representativeness of the 698 respondents who received the part of the survey that is analyzed in the present survey was tested with respect to age, gender, and geography by using *t* tests for proportions on a 95% confidence level

Imagine that your GP has decided to close his/her practice, and that you have the possibility to choose between two other GPs, GP A and GP B. (Imagine that you have to close your practice, and that your patients have the possibility to choose between two other GPs, GP A and GP B)

	GP A	GP B
Typical waiting time on the telephone	15 minutes	1 minute
Opening hours (besides from normal opening hours)	Open in Saturdays	No extended opening hours
Typical waiting time to the appointment (with a non acute problem)	3 days	2 weeks
Distance to the general practice	5 kilometres	15 kilometres
Typical waiting time in the waiting room	20 minutes	10 minutes
Average time allocated to the consultation	5 minutes	30 minutes
Who performs routine tasks (e.g. blood samples, tests for allergies, vaccination)	General practitioner	Nurse

Which GP would you prefer?(Which GP do you think your typical patient would prefer?)

GP A □ GP B □

Now imagine that your GP has decided not to close his/her practice anyway and that you hereby have the opportunity to choose between the two GPs A and B and your current GP. Which GP would you prefer now? (Now imagine that you do not have to close your practice anyway and that your patients hereby have the opportunity to choose between the two GPs A and B and you. Which GP do you think your typical patient would prefer now?

My current GP (Myself) □ GP A □ GP B □

Fig. 1 – Example of a discrete choice question as it was presented to the patients (general practitioners [GPs]).

[26]. In the following text, we refer to the random sample of Danish citizens as general practice patients, because almost all citizens will visit their GP at some point in time and 87% of all citizens visit their GP at least once per annum [40].

The GPs received a paper-based questionnaire in September 2010. The questionnaire was mailed to a simple random sample of 1822 GPs corresponding to half of all GPs in Denmark. One reminder was sent out during the data collection process together with a copy of the questionnaire. Of the 1822 distributed questionnaires, 969 were returned, resulting in a response rate of 53%. The representativeness of the GPs with respect to age, gender, and geography was tested by using t tests for proportions on 95% confidence levels [26]. The 969 GPs serve more than 25% of the Danish population. Because patient and GP data could not be matched, however, it was not possible to investigate which GPs serve which patients, and possible nonalignment in preferences may arise because of estimation at an aggregate and unmatched level. This is further addressed in the "Discussion" section.

Modeling and strategy for data analyses

In the DCE respondents are asked to choose their preferred alternative from a set of hypothetical alternatives. It is assumed that individuals choose the alternative that maximizes utility and that individuals have well-behaved preferences [41]. According to random utility theory [42], the true but unobservable utility for alternative j of individual i can be written as

$$U_{ij} = V_{ij}(X_{ij}, \beta) + \varepsilon_{ij} \quad (1)$$

where V_{ij} represents the observable systematic component of utility that is the explainable proportion of the variance in utility of alternative j and ε_{ij} is the nonexplainable proportion representing the unobservable and random treated component. Assuming a linear additive utility function, the observable component for individual i for alternative j becomes $V_{ij} = \beta X_{ij}$, where $X_{ij} = (x_1, x_2, \ldots, x_\gamma)$ is a vector of attributes [43].

Following the objective of the study, two research questions were posed.

Research question 1: do GPs know the preferences of the patients when status quo is not an option?

This was tested by investigating whether stated preferences differ across GPs and patients at the aggregate level for the attributes included in the forced choice DCE. First, the test of equal parameters [44] was used to investigate parameter equality between the two groups of respondents. Second, the rank orders of the attributes for the two groups were compared and comparisons for all possible combinations of MRS estimates were made for GPs and patients (only MRS estimates with distance as denominator are explicitly reported). Standard errors were estimated by using the delta method [45]. Third, choice behavior of the GPs and patients was investigated and compared by using Pearson's chi-squared test.

Research question 2: do GPs know the preferences and loyalty of the patients when they have the option of staying with their current GP?

This was tested by comparing stated preferences for GPs and patients in the unforced choice DCE. The tests were similar to those used in research question 1. Status quo characteristics were assumed to be equal across groups.

In addition, subgroup analyses were performed to test for alignment across patients' preferences and GPs' perceptions of these preferences for specific subgroups of GPs and patients, respectively. Tests for equal parameters [44] were applied. Results

Table 2 – Estimation results for the full model, patients, GPs, and a heteroscedastic full model for forced choice (standard error).

	Full model	Patients	GPs	Heteroscedastic model
Parameters				
Telephone	−0.036 (0.002)*	−0.032 (0.003)*	−0.039 (0.003)*	−0.038 (0.003)*
Opening hours	−0.117 (0.024)*	−0.014 (0.038)	−0.175 (0.028)*	−0.118 (0.024)*
Appointment	−0.064 (0.004)*	−0.071 (0.007)*	−0.060 (0.006)*	−0.069 (0.005)*
Distance	−0.046 (0.002)*	−0.054 (0.003)*	−0.040 (0.003)*	−0.050 (0.003)*
Waiting room	−0.012 (0.003)*	−0.001 (0.004)	−0.021 (0.003)*	−0.013 (0.003)*
Consultation time	0.032 (0.003)*	0.023 (0.004)*	0.039 (0.003)*	0.034 (0.003)*
Routine tasks	0.001 (0.022)	0.001 (0.037)	0.031 (0.030)	−0.001 (0.024)
ASC A	0.146 (0.030)*	0.135 (0.046)*	0.159 (0.040)*	0.157 (0.032)*
Heteroskedasticity				
Scale (GPs = 1)				−0.123 (0.068)†
LL(0)	−4444	−1935	−2509	−4444
LL(model)	−3608	−1524	−2028	−3605
Pseudo R^2	0.188	0.212	0.192	0.189
n (observations)	12824	5584	7240	12824
N (respondents)	1667	698	969	1667
LR test	Equal utility parameters – $df = 9$ (critical $\chi^2_{0.95}$): 106.036 (16.919)			

ASC, alternative specific constant; GPs, general practitioners; LL, log-likelihood; LR, likelihood-ratio.
* Explanatory power at a 0.01 significance level.
† Explanatory power at a 0.05 significance level.

are not reported in the "Results" section, but briefly touched upon in the "Discussion" section.

Assuming that the error terms in Equation (1) are independent and identically distributed (iid) extreme value random variables, a canditional logit (CL) model can be specified (the IIA assumption has been tested and shown to hold in the unforced choice models for both GPs and patients.)

$$P_{ij} = \frac{e^{\mu X_{ij}\beta}}{\sum_{j=1}^{J} e^{\mu X_{ij}\beta}} \quad (2)$$

where μ is the scale parameter that is inversely related to the error variance. The scale parameter entails that attribute weights in DCEs are not directly comparable, and instead it is possible to measure the relative impact of the attributes by calculating the MRS given that a linear additive function is appropriate. In the CL model, the error variances are assumed to be constant across individuals. To allow heterogeneity in the scale parameter, a heteroscedastic conditional logit (HCL) model can be used, in which the variance of unobserved factors is allowed to vary over individuals [43]. In the HCL model, the source of variance can be tested; that is, it is possible to test whether error variances differ across GPs and patients. The HCL model was also used to test for equal parameters by using the log-likelihood test of parameter equality [44]. Models were estimated in Stata 10 by using the clogit and clogithet commands (the Stata command clogithet is written by Hole [46]).

Results

Descriptive statistics

The representativeness of the samples was tested on the variables age, gender, and geography (distribution of respondents in the five regions of Denmark). Results from the patient questionnaire showed that respondents aged 18 to 29 years were overrepresented in the sample ($P < 0.001$), while there were fewer respondents represented in the sample in the age groups 40 to 49, 60 to 69, and 89+ years ($P < 0.001$). The sample was representative with respect to gender and geography. The sample of GPs was representative with respect to gender, geography, and age except for the age group 70+ years, which was slightly underrepresented in the sample ($P = 0.014$). The random allocation of GPs and patients across DCE blocks was successful because no statistically significant differences in respondent compositions across blocks were detected (with respect to age, gender, and geography). Essential patient and GP characteristics are reported in Table A1 in the Appendix (available at Supplemental Materials found at doi: 10.1016/j.jval.2012.01.002) together with attitudinal answers to questions about the organization of general practice.

Research question 1: do GPs know patients' preferences when status quo is not an option?

Four logit models based on forced choice data are presented in Table 2. The full model includes observations from both patients and GPs, while the next two models provide estimates for the groups separately. The fourth model is an HCL model, in which scale is allowed to differ between patients and GPs. The goodness-of-fit statistics show that all four models have reasonably good model fits with pseudo R^2 around 0.2 [47]. For the patient model, the statistically significant attributes have the expected signs, and three attributes (opening hours, waiting room, and routine tasks) are seen to be statistically insignificant, indicating that choice of GP is not generally influenced by these attributes. For the GP sample, only one attribute is statistically insignificant, that is, routine tasks. The other attributes are statistically significant at a 95% confidence level with the expected signs, except for the attribute opening hours, which has a negative sign. The likelihood ratio test of equal parameters across the two groups rejects that parameters are equal. Furthermore, it is seen that GPs' preferences are characterized by a significantly lower scale, that is, higher variance (assuming equal utility parameters).

Table 3 presents MRS estimates (with the distance attribute as denominator) and rank orders (derived from the CL model). From the table it is evident that the MRS for the attributes telephone, opening hours, waiting room, and consultation time are statistically significantly different between GPs and patients. Furthermore, the rank orders of the attributes are very different for the two groups. Looking at the sizes of MRS estimates it is seen that the waiting time for the appointment is valued equally across the two groups (although rank order differs), whereas MRS for opening

Table 3 – MRS, confidence intervals, and rank order of attributes for patients and GPs in forced choice.

Attribute	Patients			GPs		
	MRS*	95% CI	Rank order	MRS*	95% CI	Rank order
Telephone (min)	−0.592	−0.733 to −0.450	3	−0.983	−1.192 to −0.774	6
Opening hours (open on Saturdays = 1)	−0.521	−3.310 to 2.269	4	−8.820	−11.942 to −5.698	1
Appointment (d)	−1.314	−1.585 to −1.043	1	−1.508	−1.849 to −1.168	3
Distance (km)	—	—	2	—	—	4
Waiting room (min)	−0.020	−0.179 to 0.138	7	−0.520	−0.681 to −0.359	7
Consultation time (min)	0.432	0.314–0.551	5	0.992	0.846–1.139	5
Routine tasks (nurse = 1)	0.039	−2.622 to 2.699	6	4.005	−1.336 to 4.473	2

CI, confidence interval; GPs, general practitioners; MRS, marginal rates of substitution.
* MRS was multiplied two for effect-coded attributes.

hours is very different for the two groups. Also, waiting time in the waiting room is ranked as lowest for each group, but MRS estimates differ significantly. All other possible combinations of MRS estimates were also explored with continuous attributes as denominators, and more differences were found in the MRS estimates between GPs and patients. More specifically, it was found that the following MRS estimates differed: Opening hours/Telephone, Distance/Telephone, Waiting room/Telephone, Opening hours/Appointment, Waiting room/Appointment, Consultation time/Appointment, Appointment/Consultation time, and Distance/Consultation time.

The choice behaviors of GPs and patients in the forced choice are shown in Table 4 in which it can be seen that choice behavior is statistically significantly different between GPs and patients on more than half of the 16 choice sets.

Research question 2: do GPs know the preferences and loyalty of the patients when they have the option of staying with their current GP?

In Table 5 the four logit models related to the unforced choice are presented. The goodness-of-fit statistics show that all four models are very good at predicting preferences with pseudo R^2 above 0.5. In both the patient and GP models, the attributes have the expected signs. The attribute routine tasks is statistically insignificant in both models, while the attribute waiting time in the waiting room is statistically insignificant only in the patient model. The likelihood ratio test of equal parameters across the two groups rejects that parameters are equal in the case of an unforced choice. Furthermore, GPs are seen to have a statistically significantly higher scale, that is, lower variance (assuming equal utility parameters) than are patients in the unforced choice model.

Looking at the MRS and rank orders in Table 6, it is seen that MRS for the attributes telephone and waiting room are statistically significantly different and that MRS for all attributes are generally higher for the GPs than for the patients. However, rank orders are similar except for the attribute distance, which is ranked differently across the two groups. GPs underestimate the importance of distance to patients. When looking at all possible combinations of MRS estimates with continuous attributes as denominators, it was found that in addition to the differences in MRS shown in the table, MRS estimates also differed for Distance/Telephone and Distance/Consultation time.

The choice behaviors of the GPs and patients in the unforced choice are shown in Table 7, in which it is seen that there are differences in choice of GP in most choice sets. Generally, GPs overestimate the frequency with which patients choose their current practice except for choice set 15 where choice behavior is similar in the two groups and choice set 7 where patients' choice of current practice is underestimated.

Table 4 – Choice behavior of patients and GPs and a comparison using chi-squared statistics in forced choice (%).

	Patients		GPs		Chi-squared statistic (*P*)
	GP A	GP B	GP A	GP B	
Choice set 1	30.85	69.15	34.45	65.55	0.64 (0.422)
Choice set 2	86.07	13.93	92.08	7.92	4.15 (0.042)
Choice set 3	75.62	24.38	68.53	31.47	2.67 (0.102)
Choice set 4	17.41	82.59	18.88	81.12	0.16 (0.692)
Choice set 5	74.07	25.93	71.62	28.38	0.32 (0.574)
Choice set 6	68.25	31.75	54.11	45.89	8.70 (0.003)
Choice set 7	78.31	21.69	56.00	44.00	22.84 (0.000)
Choice set 8	61.90	38.10	36.82	63.18	25.62 (0.000)
Choice set 9	15.05	84.95	18.06	81.94	0.71 (0.400)
Choice set 10	35.92	64.08	27.43	72.57	3.60 (0.058)
Choice set 11	26.21	73.79	60.71	39.29	51.79 (0.000)
Choice set 12	32.04	67.96	47.93	52.07	11.10 (0.001)
Choice set 13	97.06	2.94	98.67	1.33	1.01 (0.316)
Choice set 14	30.39	69.61	9.95	90.05	21.25 (0.000)
Choice set 15	85.29	14.71	94.52	5.48	7.69 (0.006)
Choice set 16	25.49	74.51	46.01	53.99	12.17 (0.000)

GPs, general practitioners.

Table 5 – Estimation results for the full model, patients, GPs, and a heteroscedastic full model for unforced choice (standard error).

	Full model	Patients	GPs	Heteroscedastic model
Parameters				
Telephone	−0.040 (0.004)*	−0.024 (0.005)*	−0.075 (0.008)*	−0.038 (0.004)*
Opening hours	0.232 (0.047)*	0.197 (0.062)*	0.364 (0.078)*	0.220 (0.041)*
Appointment	−0.105 (0.012)*	−0.087 (0.014)*	−0.136 (0.017)*	−0.095 (0.009)*
Distance	−0.046 (0.005)*	−0.051 (0.006)*	−0.039 (0.007)*	−0.039 (0.004)*
Waiting room	−0.017 (0.005)*	−0.009 (0.007)	−0.038 (0.008)*	−0.017 (0.004)*
Consultation time	0.038 (0.004)*	0.022 (0.005)*	0.068 (0.007)*	0.036 (0.003)*
Routine tasks	0.036 (0.042)	0.055 (0.055)	0.075 (0.067)	0.040 (0.037)
ASC A	−1.473 (0.151)*	−1.194 (0.212)*	−1.593 (0.223)*	−1.211 (0.135)*
ASC B	−1.681 (0.141)*	−1.433 (0.206)*	−1.797 (0.215)	−1.395 (0.131)*
Heteroskedasticity				
Scale (GPs = 1)				0.278 (0.040)*
LL(0)	−7112	−3067	−4045	−7112
LL(model)	−2748	−1431	−1252	−2709
Pseudo R^2	0.614	0.534	0.691	0.619
n (observations)	19422	8376	11046	19422
N (respondents)	1667	698	969	1667
LR test	Equal utility parameters – $df = 10$ (critical χ^2_{095}): 52.177 (18.307)			

ASC, alternative specific constant; GPs, general practitioners; LL, log-likelihood; LR, likelihood-ratio.
* Explanatory power at a 0.01 significance level.

Discussion

The present study investigated whether GPs know the preferences of patients at an aggregate level with respect to a number of organizational characteristics in general practice. This was tested by using a dual-response DCE in which parameter equality, MRS, rank orders, and choice behavior across choice sets were examined for GPs and patients in both the forced choice and the unforced choice. It was found that GPs have a clearer understanding of patient preferences in the unforced choice DCE because GPs correctly predict the rank orders of the attributes (except for distance) although they do not adequately realize the need to compete to keep present patients on their list. In the forced choice DCE, our results suggest that GPs are not aware of which attributes are of importance in patients' choice of a new GP.

In the forced choice DCE, the test for equal utility parameters was rejected, and MRS and rank orders were seen to differ on most attributes. In the unforced choice DCE, preferences were also seen to differ although the rank order was the same for GPs and patients except for the distance attribute, which was underestimated by the GPs. An important result was that GPs tend to overestimate patients' inclination to choose their current GP. Although patients are prone to choosing their current GP when they have the opportunity to do so (patients chose current GP in 84% of choices), GPs indicate themselves as patients' preferred choice in 90% of cases. This tendency is reflected in the higher negative coefficients on the alternative specific constants A and B in the GP model in Table 5. The result suggests that GPs are not fully aware of the need to compete on the features of their GP practice to keep patients on their list. Although GPs underestimate the necessity of competition, they do seem to know which attributes patients perceive as important when choosing among their present GP and a new GP.

That GPs are not fully aware of patients' preferences is in line with the findings of Marshall et al. [13] and Mühlbacher and Nübling [14], who also found divergence between patients' preferences and health-care providers' perceptions of patients' preferences. In addition, Marshall et al. [13] found that GPs overestimated the frequency with which patients chose the opt-out option. This is also in line with our findings. Contrarily, Neuman and Neuman [15] found that physicians' perceptions of preferences were close to the preferences of patients with multiple myeloma.

Table 6 – MRS, confidence intervals, and rank order of attributes for patients and GPs in unforced choice.

Attribute	Patients			GPs		
	MRS*	95% CI	Rank order	MRS*	95% CI	Rank order
Telephone (min)	−0.466	−0.686 to −0.246	5	−1.890	−2.614 to −1.165	4
Opening hours (open on Saturdays = 1)	7.807	3.257–12.358	1	18.473	10.705–26.241	1
Appointment (d)	−1.721	−2.444 to −0.997	3	−3.440	−5.071 to −1.810	3
Distance (km)	—	—	4	—	—	6
Waiting room (min)	−0.183	−0.441 to 0.075	7	−0.956	−1.453 to −0.459	7
Consultation time (min)	0.427	−0.217 to 0.638	6	1.718	1.048–2.387	5
Routine tasks (nurse = 1)	2.168	−2.149 to 6.486	2	3.826	−3.222 to 10.873	2

CI, confidence interval; GPs, general practitioners; MRS, marginal rates of substitution.
* MRS was multiplied by two for effect-coded attributes.

Table 7 – Choice behavior of patients and GPs and a comparison using chi-squared statistics in unforced choice (%).

	Patients			GPs			Chi-squared statistic (*P*)
	GP A	GP B	Status quo	GP A	GP B	Status quo	
Choice set 1	4.98	6.97	88.06	2.05	0.00	97.95	20.95 (0.000)
Choice set 2	22.89	4.98	72.14	13.11	0.82	86.07	15.74 (0.000)
Choice set 3	6.97	2.99	90.05	2.94	1.27	95.78	5.60 (0.061)
Choice set 4	1.49	9.95	88.56	1.69	3.80	94.51	6.67 (0.036)
Choice set 5	5.82	3.17	91.01	0.42	1.26	98.33	13.43 (0.001)
Choice set 6	16.93	4.23	78.84	8.05	1.27	90.68	12.18 (0.002)
Choice set 7	20.63	4.23	75.13	16.88	12.12	71.00	8.58 (0.014)
Choice set 8	7.94	4.76	87.30	0.87	6.96	92.17	13.88 (0.001)
Choice set 9	3.40	11.65	84.95	0.88	6.19	92.92	7.68 (0.021)
Choice set 10	8.25	14.08	77.67	0.44	9.21	90.35	20.22 (0.000)
Choice set 11	2.43	9.71	87.86	0.89	2.67	96.44	11.26 (0.004)
Choice set 12	3.88	10.68	85.44	7.24	3.17	89.59	11.21 (0.004)
Choice set 13	19.61	0.00	80.39	11.95	0.00	88.05	3.36 (0.087)
Choice set 14	7.84	7.84	84.31	3.59	11.66	84.75	3.55 (0.169)
Choice set 15	10.78	1.96	87.25	15.60	0.92	83.49	1.87 (0.393)
Choice set 16	0.98	9.80	89.22	0.46	7.37	92.17	0.87 (0.648)

GPs, general practitioners.

Limitations and implications

There are limitations to this study. Both groups of respondents are not representative with respect to age compared with their respective populations (although GPs are only slightly underrepresented for respondents aged 70+ years). This means that to the extent age influences preferences for the characteristics included, results are not fully generalizable to the Danish population. We tested whether age was a significant explanatory factor in our analyses by including the over- and underrepresented age groups as interaction variables in the CL models for forced and unforced choices. Results showed that all interaction variables were insignificant except for the interaction variable waiting time on the telephone x patients aged 60 to 69 years ($P = 0.029$) in the forced choice. This result indicates that patients in this age group have more disutility from waiting on the phone than do the rest of the respondents. Based on the overall findings, it is argued that the lack of representativity on age does not influence our results markedly, indicating that results to a great extent are generalizable to the Danish population.

It must be acknowledged that there are several potential sources of bias such as nonresponse bias, self-selection bias, and avidity. Survey mode bias may also be a problem, particularly for the sample obtained from using an online survey. In the Danish setting, this problem is thought to be reduced because a significant proportion of the Danish population has Internet access in their homes.

Also, the design of the survey can affect results, and in particular the choices of levels have been shown to have an impact on elicited preference structures, for example, [48–51]. In the present study, the utmost has been done to apply appropriate and policy-relevant attribute levels. For example, waiting times were recorded during observational stays in randomly chosen general practices where it was found that an appropriate upper limit for waiting time was 30 minutes. Generally, level ranges were chosen on the basis of examination of results from other studies investigating patients' preferences for the organization of general practice, interviews with patients, visits to general practices, interviews with GPs, and discussions with the Organisation of General Practitioners in Denmark. The MRS and the relative differences in GP and patient preferences observed in this study should, however, not be extrapolated beyond the attribute levels applied.

The criteria for the selection of attributes were chosen to ensure operable and policy-relevant results that could inform GPs and policy makers on how practical improvements of the agency relationship could be made. It would also be of interest, however, to look at other attributes that might influence patients' choice of GP such as age and gender of the GP, the GP's reputation, recommendations from family and friends, and mutual understanding between the GP and the patient. Previous research exists on these topics (see, e.g., [52,53]). When designing the present survey, the attributes included were deemed the best to pursue the objectives of this article. Clearly, the attributes included in this survey are just one of several possible combinations, and it is thus not necessarily a superior set of attributes. More research on preferences for other attributes related to patients' choice of GP is warranted.

Possible explanations for nonalignment of preferences

Our results show that when patients are forced to choose a new GP, they consider only some organizational attributes, that is, waiting time on the telephone, waiting time to the appointment, distance, and consultation time, while GPs think that all attributes (except for routine tasks) are important in the choice of a new GP. We tested whether the larger GP sample size affected our results by performing the analyses with a random subsample of 698 GPs. This did not change the significance of the attributes.

An explanation for the differences in expressed patient preferences across the two respondent groups may be that GPs have responded strategically to the discrete choice questions and stated their own preferences instead of the patients' preferences. That GPs in the forced choice DCE believe that patients derive negative utility from extended opening hours strongly suggests that this may be the case. This raises the question of whether GPs are capable of acting as agents for the patients in real life when they are not capable of doing so when explicitly asked to in an exercise. Future research should explore this further. To verify whether some GPs are more aware of patients' preferences, we performed subgroup analyses (data not reported). When rerunning the aforementioned regressions including only young GPs, GPs who recently established themselves in general practice, or GPs who believe that patients should be involved in decision making, the overall results remained the same.

Divergence in preferences in the forced choice may be partly due to the rather hypothetical situation the GPs are put in because they are asked to imagine that they have to close their practice and that their patients have to choose a new GP. The higher variances

observed in the regression analyses based on GPs' responses to forced choices support this hypothesis. In the unforced choice, GPs have lower variance than the patients, suggesting that they are more certain of their answers (which for the majority of responses is the status quo option). That rank orders are similar for all attributes except for distance in the unforced choice also suggests that GPs have greater difficulties predicting the more hypothetical aspects in choice of GP. The distance attribute must be deemed the most hypothetical attribute from the GPs' point of view, because it is an attribute that is more difficult to influence than the other attributes.

In the unforced choice, divergence in preferences may also be explained by differences in GPs' and patients' reported status quo characteristics (see Table A1 in the Appendix [Respondent Characteristics] in Supplemental Materials found at doi: 10.1016/j.jval.2012.01.002). For example, it is seen that compared with the GPs, patients report longer waiting times on the telephone and in the waiting room and shorter consultations. The dispersion in status quo characteristics entails that the status quo option will appear more attractive to the GPs than to the patients. This may explain why GPs choose the status quo option more often than the patients. The differences in reported status quo characteristics can be due to real differences or due to differences in perceptions of reality (or a mixture). Geographically, GPs and patients are representative of their respective populations, and the GPs included in the sample serve more than 25% of the Danish population. It is therefore most likely that the differences in status quo characteristics across samples are attributable to differences in perceptions of reality. An additional explanation may be that by providing the patients with information on GP characteristics, which they usually do not possess, the market becomes more transparent and transaction costs decrease. This may prompt patients to choose a new GP more often than is normally experienced by the GPs. The discrepancy in GPs' perceptions of patient preferences and patients' expressed preferences for the status quo may therefore be driven by the fact that GPs' responses are based on experiences of patients' behavior in a less informed setting whereas patients' expressed preferences are steered by the increased level of information on practice characteristics. Clearly, more research on this topic is warranted to better understand the underlying mechanisms.

Why such a large proportion of respondents chose status quo in the unforced choices cannot be verified. We could be dealing with true preferences for the current GP. This hypothesis is supported by the fact that there is a general satisfaction with current GPs (89% of the patients stated that they were satisfied with their GP). However, the high proportion may also be caused by the use of the dual-response approach. In a study of Dhar and Simonson [54], it was found that respondents were more likely to choose the status quo alternative when respondents were first presented with a forced choice. Contrarily, Brazell et al. [27] found no systematic biases in the applications of dual-response approaches. Future studies should add to the knowledge on how the dual-response approach affects preferences.

Finally, the lack of congruence between GPs' and patients' choices may be explained by the fact that GPs are likely to make choices on the basis of their perceptions of the preferences of those patients who are regular visitors in the clinic. Frequent visitors are unlikely to be representative of the full sample of patients on the GP lists, and hence GPs may have a biased view of patient preferences. To test for potential bias, the analyses were rerun including only those patients who had visited their GP within the last year or patients who had visited their GP more than two times within the last year. Seemingly, our results are robust, because the preferences among these selected patient groups and the GPs' perceptions of patient preferences remain different. It should be noted that although we do observe nonalignments in patients' preferences and GPs' perceptions of these preferences at the aggregate level, this does not preclude that alignments may be present to some extent at the individual practice level. In the current analyses it was not possible to link patients to their specific GP. It was possible, however, to test for alignment of preferences on a regional level (although sample sizes become very low). It was found that GPs in Region Zealand and the North Denmark Region had utility parameters equal to those of the patients in both forced and unforced choices. GPs in The Capital Region of Denmark had utility parameters equal to those of the patients in the unforced choice, while GPs in the Region of Southern Denmark and in the Central Denmark Region had different utility parameters compared with those of the patients. This indicates that there may be alignment of preferences on a more disaggregated level. However, the results could be influenced by very small sample sizes. Future analysis should test whether alignment of preferences is increased if patient and GP data are matched.

Conclusions

Overall, our conclusion that GPs are not fully aware of patient preferences at an aggregate level appears to hold. Even though GPs almost succeeded in predicting the rank order of preferences in the unforced choice, there is still room for improving the agency relationship in the organization of general practice. The underlying reason for nonalignment of preferences may be a lack of incentives among GPs for investing time and effort into establishing such knowledge. Lack of knowledge of patient preferences is more likely to occur in markets in which market powers are put aside because of third-party regulations and/or in countries in which the need to compete for patients is reduced because of shortage of GPs, as is the case in Denmark. Lack of competition on the market for general practice services renders the exercise of eliciting the public's preferences for these services even more imminent. When market forces cannot ensure optimal resource allocations and proper prioritization of important aspects of health-care services, it is of great value that policy makers and planners are aware of the preferences of the general public.

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Supplementary Data

Supplemental material accompanying this article can be found in the online version as a hyperlink at doi: 10.1016/j.jval.2012.01.002 or, if a hard copy of article, at www.valueinhealthjournal.com/issues (select volume, issue, and article).

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